Uwchraddio'r Grid
Pentir i Drawsfynydd

The Great Grid Upgrade
Pentir to Trawsfynydd



PTNO-AEC-ZZZZ-ZZZZZZ-RPT-ES-000001

Prosiect i Atgyfnerthu'r cysylltiad rhwng Pentir a Thrawsfynydd

Pentir to Trawsfynydd Reinforcement Project

Environmental Statement Volume 1: Project Introduction
November 2025

nationalgrid

Contents

1. Introduction 1

1.1 Introduction 1
1.2 The Applicant 1
1.3 The Current Situation 2
1.4 Project Overview 4
1.5 Project Background and Need 6

2. Consenting Requirements 8

2.1 Introduction 8
2.2 Applications for planning permission under the Town and Country Planning Act 1990 (as amended) 8
2.3 Applications for consent under s37 of the Electricity Act 1989 9
2.4 Works not requiring Planning Permission 9

3. EIA Process 10

3.1 EIA Screening 10
3.2 EIA Scoping 11
3.3 Environmental Statement 11

4. Environmental Assessment Methodology 16

4.1 Introduction 16
4.2 Consultation 17
4.3 Baseline Data Collection 17
4.4 Identification of Potential Effects 17
4.5 Mitigation 17
4.6 Assessment of Residual Likely Significant Effects 18
4.7 In-combination and Cumulative Effects 20
4.8 Monitoring 21

Bibliography 22

Figures 23

1. Introduction

1.1 Introduction

1.1.1 This Environmental Statement (ES) accompanies applications by National Grid Electricity Transmission (plc) (NGET) to seek powers to construct, operate and maintain the Pentir to Trawsfynydd Reinforcement Project (the 'Project'). Applications are being made both under The Town and Country Planning Act 1990 (as amended) ('TCPA') (Ref 1.1), and Section 37 of The Electricity Act 1989 ('the Electricity Act') (Ref 1.2).

1.1.2 The Project is illustrated on **Figure 1.1.1** and falls within the administrative boundaries of Gwynedd Council and Eryri (previously Snowdonia) National Park Authority.

1.2 The Applicant

1.2.1 NGET operates the electricity transmission system in Great Britain and owns the system in England and Wales. The system operates at 400 kV and 275 kV, connecting electricity generators to substations where higher voltages are transformed to lower voltages, enabling the power to be distributed to homes and businesses by the Distribution Network Operators.

1.2.2 Transmission of electricity in Great Britain requires permission by way of a licence granted under Section 6(1)(b) of the Electricity Act. NGET has been granted a transmission licence and is bound by the legal obligations, which are set out primarily in the Electricity Act and the transmission licence. NGET is the only company licensed to transmit electricity in England and Wales. Under Section 9 of the Electricity Act NGET is required, in this capacity, to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the supply and generation of electricity.

1.2.3 NGET is also required, under Section 38 of the Electricity Act, to comply with the provisions of Schedule 9 of the Electricity Act. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to:

- Schedule 9(1)(a) '…*have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest*;' and
- Schedule 9(1)(b) *'…do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*'.

1.2.4 This ES includes an assessment of all the environmental aspects listed in Schedule 9(1)(a) and includes proposals for mitigation as required under Schedule 9(1)(b).

1.3 The Current Situation

1.3.1 Pentir substation is an existing 400 kilovolt (kV) substation in north-west Wales, approximately 4.5 kilometres (km) south-west of Bangor, in the Gwynedd local authority area.

1.3.2 Trawsfynydd 400 kV substation is an operational substation located approximately 1.2 km south of Gellilydan, in the Gwynedd Council and Eryri National Park (ENP) authority areas.

1.3.3 The existing electricity line between Pentir and Trawsfynydd was first installed in the 1960s and runs for approximately 41 km (see Plate **1-1**). It comprises a double circuit (an 'inland' A circuit and a 'coastal' B circuit) overhead line using L6 pylons between Pentir substation and a cable sealing ends compound (CSEC) at Wern; underground electricity cables between Wern CSEC and Garth CSEC approximately 6 km east across the River Glaslyn; and a double circuit overhead line on L6 towers between Garth CSEC and Trawsfynydd substation. The overhead line is the 4ZC line and the underground section is known as the Glaslyn Cables. It exits the existing Pentir substation to the south and enters Trawsfynydd substation on its northern boundary.

1.3.4 Since the electric line comprising the circuits between Pentir and Trawsfynydd was constructed four areas through which it runs have been designated Sites of Special Scientific Interest (SSSI) and three areas designated a Special Area of Conservation (SAC) (**Figure 1.1.1**).

1.3.5 The 'inland' circuit A between Pentir and Trawsfynydd, comprising overhead line and underground cables, is the PTNC1 circuit which has continuously operated at 400 kV since its construction.

1.3.6 The 'coastal' circuit B between Pentir and Trawsfynydd is the PTNO circuit and presently operates differently to the 'inland' circuit A PTNC1 circuit. This overhead line, between Trawsfynydd and Garth Cable Sealing End Compound (CSEC), and between Wern CSEC and Tower 4ZC070 (south of Bryncir village), is constructed to 400 kV clearances but is fitted with 132 kV conductors and is operated by Scottish Power Energy Networks (SPEN). The existing underground cables between Garth CSEC and Wern CSEC are 132 kV underground cables and are also operated by SPEN.

1.3.7 At Tower 4ZC070 the 132 kV supply is taken from the 4ZC by downleads to the SPEN DB 132 kV overhead line (SPEN DB route) which runs to Four Crosses substation on the Llyn peninsula. The 132 kV assets on the 4ZC circuit and the SPEN DB route are owned and operated by SPEN. The SPEN DB route supports are 132 kV steel gantries where the line changes direction and single wooden pole Trident supports when it runs in a straight line. It is strung with Lynx conductors at present but has been scheduled for an upgrade to Poplar conductors.

1.3.8 The existing 'coastal' B circuit north of Tower 4ZC070 is strung with 400kV conductors but these are not presently operated between Tower 4ZC070 and Tower 4ZC140.

1.3.9 Underground cables from Dinorwig connect to the coastal' B circuit at Tower 4ZC140 by downleads from the Penisarwaun CSEC. The circuit then runs north to Pentir substation.

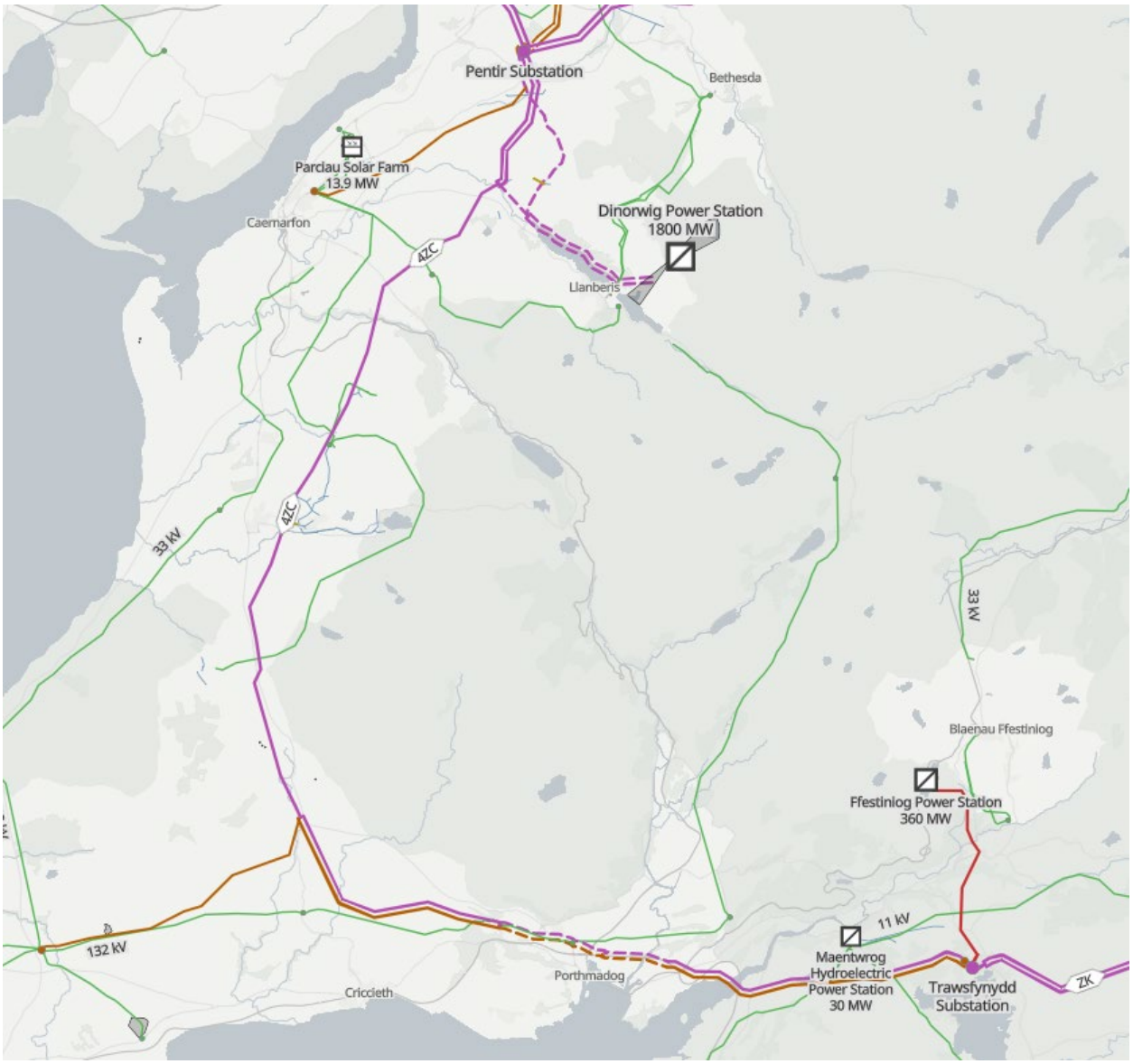


Plate 1-1 – The current situation[1]

Eryri Visual Impact Provision Project

1.3.10 The Eryri Visual Impact Provision (EVIP) is a National Grid project which is currently in the construction phase. EVIP's scope is to replace a 3.3 km section of the existing Pentir to Trawsfynydd overhead line with cables in a tunnel (between the existing Garth CSEC and Tower 4ZC027). This will allow the removal of ten pylons. The aim of EVIP is to reduce the visual impact of National Grid's overhead line across the Dwyryd Estuary from Minffordd to Llandecwyn. EVIP was identified following an assessment of opportunities in National Parks and Areas of Outstanding Natural Beauty (now National Landscapes).

1.3.11 Construction compounds and site offices for EVIP are now established, shaft piling work has commenced and detailed design for all work packages is underway.

1.3.12 There is a direct interaction between the Project and the EVIP at the new Minffordd CSEC and Tunnel Head House (THH). On completion, EVIP was designed to have

[1] https://www.openstreetmap.org/copyright

its cables emerge from the Minffordd THH and run a short distance north-east to the existing Garth CSEC. The replacement of the Glaslyn Cables as part of the Project, gives an opportunity for these cables to connect to the EVIP cables close to Minffordd THH. This will avoid the need for the EVIP cables and the Glaslyn cables to run further north-east from this point to the existing Garth CSEC. This arrangement will require changes to the currently consented EVIP THH.

1.3.13 A connection between the replacement Glaslyn Cables and the EVIP cables close to Minffordd THH will allow removal of the existing Garth CSEC which will become redundant.

Dinorwig to Pentir

1.3.14 National Grid is replacing the existing underground cables between the Dinorwig Power Station and Pentir substation. This project is currently in construction and is due to be completed in late 2026. Two circuits run between Dinorwig and Pentir substation. One runs to Pentir substation from Dinorwig by underground cables. Another circuit runs from Dinorwig to an existing CSEC (Penisarwaun) close to Tower 4ZC140 and then via the 'coastal' B circuit of the 4ZC overhead line to Pentir substation. Each of these underground cable circuits are being replaced. The overhead line circuit between Tower 4ZC140 and Pentir substation does not require replacement.

1.4 Project Overview

1.4.1 The Project encompasses the reinforcement of overhead lines and cables on the existing circuits ('inland' A circuit and 'coastal' B circuit) between Pentir and Trawsfynydd substations; the provision of a new substation at Bryncir to provide a connection to the DNO (SPEN); the provision of a shunt reactor at Trawsfynydd; new and replacement high voltage underground cables works (Glaslyn Cables); associated protection and control works at Pentir and Trawsfynydd; and installation of a fibre optic cable to the earthwire on part of the existing 4ZC overhead line (see **Figure 1.1.2**).

1.4.2 When implemented, there will be two 400 kV circuits between Pentir and Trawsfynydd substations operating at the capacity required and with a replacement 132 kV grid supply to maintain the SPEN network via its SPEN DB route.

1.4.3 The ES for the Project has been separated into volumes based on geographical location. This structure aligns with the various consent applications as follows:

- Pentir Works (**Volume 2**) – Replacement of existing underground cables; installation of new underground cables in the existing Pentir substation; and ancillary works.
- Bryncir Works (**Volume 3**) – A new substation south of Bryncir village ('Bryncir substation'); including a new access road from the A487 and the upgrading of an existing agricultural access track; replacement of Tower 4ZC067 and new downleads into Bryncir substation; construction of a new 132 kV line (partly overhead and partly underground) between the new Bryncir substation and the existing SPEN DB route connection; and removal of a redundant section of SPEN DB route.

- Glaslyn Cables Works (**Volume 4**) – An extension to the existing Wern Cables Sealing End Compound (CSEC) including a new permanent access road; a new Minffordd CSEC and Tunnel Head House (THH) (THH previously consented by the EVIP project) with permanent access; the removal of the existing Garth CSEC; installation of new 400 kV cables sections ('inland' A circuit and 'coastal' B circuit) to replace redundant 400 kilovolt (kV) and 132 kV cables; and other associated infrastructure and ancillary works.
- Trawsfynydd Works (**Volume 5**) – Replacement of downleads from Tower 4ZC005, installation of new underground cables and cable sealing ends, shunt reactor and gantry and the widening of part of the existing access road in the fenced compound at Trawsfynydd substation and ancillary works. and amendments to the Trawsfynydd substation compound fence line.
- Wider Works (**Volume 6**) – Reconductoring and replacement of fittings on the 'coastal' circuit B between Towers 4ZC005 (near the Trawsfynydd substation) and Tower 4ZC027 (at the EVIP project) and replacement of the earthwire with Optical Ground Wire (OPGW). Reconductoring and replacement of fittings between Tower 4ZC044 (Wern CESC) and Tower 4ZC070 (near the new Bryncir substation) with 400 kV conductors and replacement of the earthwire with OPGW. Installation of fibre optic cables along the existing earthwire on the 4ZC between Towers 4ZC070 and Tower 4ZC140 (near the Pentir substation) (see **Plate 1-2**).
- The Project and Cumulative Assessment (**Volume 7**) This volume looks at the interconnectivity of the works at Trawsfynydd, Pentir, Glaslyn and Bryncir combined with the Wider Works to provide the full Project impact as well as the cumulative effects of other existing and planned projects.

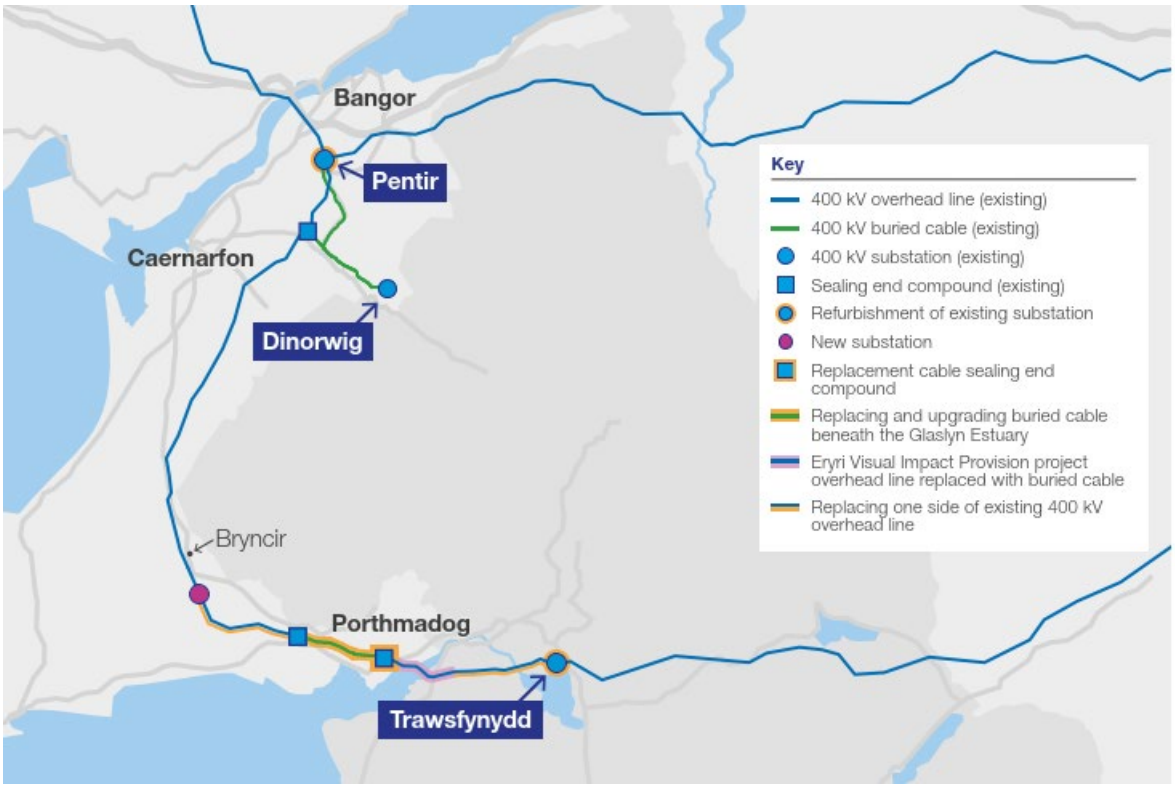


Plate 1 2 – Schematic of the 4ZC circuit (including the consented EVIP section)

1.5 Project Background and Need

1.5.1 The Welsh and UK Governments have set ambitious targets for developing new homegrown sources of renewable energy at scale over the next decade. The Welsh Government wants to meet the equivalent of 70% of Wales's electricity demand from renewable energy sources by 2030.

1.5.2 The National Energy System Operator (NESO) is responsible for identifying how the national electricity transmission system needs to be adapted to meet challenges of connecting new generation and interconnectors to address reducing carbon emissions and improving energy security. Its analysis has demonstrated that there is insufficient transmission capacity in the existing electricity transmission network in North Wales to connect additional consented, forecasted and foreseeable large scale power generation developments, notably from renewable offshore energy in the Irish Sea off the north coast of Wales and west coast of England.

1.5.3 The existing single 400 kV circuit from Pentir to Trawsfynydd limits capacity on the network. As well as being a single circuit, there is also limited capacity at the cables crossing under the Afon (River) Glaslyn near Porthmadog (the Glaslyn Cables).

1.5.4 In addition, the underground cables at Porthmadog were installed in the 1960s and are now coming to the end of their operational life. The cables need replacement to maintain the security of electricity supplies to the local area and wider region.

1.5.5 Both circuits between Pentir and Trawsfynydd need to be upgraded to increase their capacity and allow clean renewable energy to transfer to areas of demand. This will support meeting national targets to reduce reliance on fossil fuels, reducing in carbon emissions and enhancing energy security.

1.5.6 Increasing capacity on the existing double circuit electric line between Pentir and Trawsfynydd substations has been identified by Ofgem as an Accelerated Strategic Transmission Investment (ASTI), indicating the urgency of delivering the upgrades.

1.5.7 NESO confirmed that the Project is needed as part of essential works before 2030 in the Network Options Assessment (NOA)[2] and the Holistic Network Design (HND)[3]. The Project is part of the wider network transmission upgrades required to facilitate the connection of 50 Gigawatt (GW) of offshore wind by 2030 (5.48 GW in the north-west region).

Previous Work

1.5.8 The uprating of the existing Penter to Trawsfynydd circuits comprised part of the previously proposed North Wales Connection (NWC) project, supporting the cancelled Horizon Wylfa Newydd Nuclear Power Station scheme. These NWC proposals included replacement conductors on part of the existing overhead line, replacement of the Glaslyn Cables and a new 400/132 kV substation (Bryncir substation) south of the existing Tower 4ZC067. A planning consent for the Bryncir substation was obtained in 2018 and an application to extend its life was granted in March 2024. The consented design for the Bryncir substation is a small, simple

[2] Network Options Assessment (NOA) | ESO (nationalgrideso.com)

[3] A Holistic Network Design for Offshore Wind | ESO (nationalgrideso.com)

substation for a single Super Grid Transformer. The new substation design aligns with the previous proposals.

1.5.9 No other consents were sought for the previously proposed components of the present Project, however some draft environmental survey reports and EIA chapters dating from late 2017 have been reviewed to provide background information for the Project.

2. Consenting Requirements

2.1 Introduction

2.1.1 Consents will be sought to construct, operate and maintain the Project with all applications supported by this ES. These consents include planning permission under the TCPA, and consent under the provisions of section 37 of the Electricity Act. An overview of the legislation, policy and guidance that inform the assessment is described in **Volume 8, Appendix 1.1.A: Legislation, Policy and Guidance**.

2.1.2 The consent applications are detailed below.

2.2 Applications for planning permission under the Town and Country Planning Act 1990 (as amended)

2.2.1 Planning permission is required from the relevant Local Planning Authority (LPA) under the TCPA regime to lawfully construct, operate and maintain parts of the Project. NGET will apply for full planning permission for the following project components:

- Pentir: replacement of existing underground cables; installation of new underground cables in the existing Pentir substation; and ancillary works.
- Bryncir: A new substation south of Bryncir village and associated infrastructure, and ancillary works, including a new access road from the A487 and the upgrading of an existing agricultural access track, and new underground 132 kV cables connecting to the existing Electricity Networks overhead line.
- Glaslyn Cables: an extension to the existing Wern Cables Sealing End Compound (CSEC) including a new permanent access; a new Minffordd CSEC and Tunnel Head House (THH) with permanent access; the removal of the existing Garth CSEC; installation of new 400 kV cables to replace redundant 400 kilovolt (kV) and 132 kV cables; and other associated infrastructure and ancillary works.
- Trawsfynydd substation: Installation of new underground cables and cable sealing ends, shunt reactor and gantry and the widening of part of the existing access road in the fenced compound at Trawsfynydd substation and ancillary works.

2.2.2 Each of the Project components set out above will be progressed under individual planning applications which will be made to the relevant LPA. For the works requiring planning permission at Pentir, Bryncir and Glaslyn the LPA is Gwynedd Council. The LPA for the works requiring planning permission at Trawsfynydd is Eryri National Park Authority.

2.2.3 This ES will form part of the suite of planning application documents to be submitted for each planning application to help the LPAs determine each planning application aware of the likely significant environmental effects of the entirety of the Project's works.

2.3 Applications for consent under s37 of the Electricity Act 1989

2.3.1 Consent under section 37 of the Electricity Act is required to carry out some works as part of the Project. Section 37 of the Electricity Act applies to development for the construction of overhead lines with a nominal voltage of 132 kV or greater and which are less than 2 km in length. NGET will apply to the Secretary of State for Energy Security and Net Zero under section 37 of the Electricity Act for the following works:

- Bryncir - Replacement of Tower 4ZC067 and downleads into the proposed Bryncir substation.
- Bryncir - A new 132 kV overhead line (part of the route) to connect the existing SPEN DB route connection to the Bryncir substation and removal of a redundant section of SPEN DB route.
- Trawsfynydd – Amendment to downleads from the existing Tower 4ZC005 to turn into a new gantry in the substation and amendments to the fence line.

2.3.2 Section 37 consent will be sought alongside the applications for planning permission under the TCPA and the ES submitted as a supporting document.

2.3.3 It is anticipated that deemed planning permission will be granted for these works under section 90(2) of the TCPA, alongside consent under section 37 of the Electricity Act.

2.4 Works not requiring Planning Permission

2.4.1 The following works do not comprise ‘development’ under Section 55 of the TCPA and do not require planning permission. However, the potential effects of these works have been considered in **Volume 6** of the ES as part of the full assessment of effects associated with the works to reinforce the 4ZC line between Pentir and Trawsfynydd:

- Reconductoring and replacement of fittings on the SPEN 4ZC overhead line between Towers 4ZC005 and Tower 4ZC0027 and replacement of the earthwire with Optical Ground Wire (OPGW).
- Reconductoring and replacement of fittings between Tower 4ZC044 and Tower 4ZC070 with 400 kV conductors and replacement of the earthwire with OPGW.
- Installation of fibre optic cables along the earthwire between Towers 4ZC070 and Tower 4ZC140.

3. EIA Process

3.1 EIA Screening

3.1.1 Screening is the process of determining whether a project falls under the descriptions or thresholds in Schedule 1 and 2 of the Town and Country Planning (Environmental Impact Assessment) (Wales) 2017 (the '2017 TCP EIA Regulations') (Ref 2.1) or the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2017 (2017 Electricity Works EIA Regs)(Ref 2.2) and if there is a potential for significant effects on the environment.

3.1.2 No element of the Project falls within the developments identified in Schedule 1 of the 2017 TCP EIA Regs or the 2017 Electricity Works (EIA) Regs and none are a type of development described in Schedule 2 of the 2017 TCP EIA Regs. However, NGET is mindful that the Regulations have been found to have a "*wide scope and broad purpose*" and that the Glaslyn Cables section of the Project could be considered an urban development project under paragraph 10. *Infrastructure Projects in Schedule 2* due to the area of the development exceeding 5 hectares (ha).

3.1.3 Part of the replacement Glaslyn Cables will be installed in the Glaslyn Site of Special Scientific Interest (SSSI). The works will include one horizontal directional drilling (HDD) working site in the SSSI for the HDD beneath the Afon Glaslyn which will be in place for several months.

3.1.4 Planning Policy Wales (Edition 12) February 2024 (Ref 2.3), sets out guidance on protected sites. This includes the following paragraphs under 6.4.15:

> *1a) The first priority for planning authorities is to avoid damage to biodiversity in its widest sense (i.e. the variety of species and habitats and their abundance) and ecosystem functioning. Where there may be harmful environmental effects, planning authorities will need to be satisfied that any reasonable alternative sites (including alternative siting and design options) that would result in less harm, no harm or benefit have been fully considered.*
>
> *1b) Proposals in statutory designated sites are, as a matter of principle, unacceptable and therefore must be excluded from site searches undertaken by developers. This principle also extends to those sites containing protected species and habitats which are irreplaceable and must be safeguarded. Such sites form the heart of resilient ecological networks and their role and the ecosystem services they provide must be protected, maintained and enhanced and safeguarded from development. It will be wholly exceptional for development to be justifiable in such instances.*

Screening Opinion

3.1.5 A Screening Opinion for the Glaslyn Cables element of the Project was requested from Gwynedd Council on 6 September 2024 and a Screening Opinion was received on 10 October 2024.

3.1.6 The Screening Request noted that the '*proposed replacement Glaslyn Cables do not fall within the developments identified in Schedule 1 of the 2017 TCP EIA Regs and are not a type of development expressly described in Schedule 2 of the 2017 TCP EIA Regs. However, NGET is mindful that the Regulations have been found to have a "wide scope and broad purpose" and that the Glaslyn Cables works could be deemed an urban development project under 10. Infrastructure Projects in Schedule 2*.' Whilst Gwynedd Council agreed that the proposed replacement Glaslyn Cables do not fall within the development identified in Schedule 1 of the 2017 TCP EIA Regs, they consider the Project to fall within the remit of Paragraph 3 Energy industry, (a) *'industrial installations for the production of electricity, steam and hot water'* of Schedule 2 developments. The Screening Opinion states that this is because the Project seeks to increase the capacity of the existing double circuit electric lines between Pentir and Trawsfynydd substations as there is currently insufficient transmission capacity in the existing electricity transmission network in North Wales to connect additional consented, forecasted and foreseeable large scale power generation developments.

3.1.7 The 2017 TCP EIA Regulations state that development that falls within the categories of Schedule 2 which is either to be carried out in a sensitive area or satisfies a threshold or criterion in column 2 of Schedule 2 requires an EIA as it is likely to have significant effects on the environment.

3.1.8 One of the definitions of 'sensitive area' is land notified under section 28(1) (Sites of Special Scientific Interest) of the Wildlife and Countryside Act 1981(1).

3.1.9 In view of the location of part of this proposal in Glaslyn Site of Special Scientific Interest there is potential for the proposal to have significant effects on this sensitive area and therefore EIA is required for the Project (refer to Section 3.3 below detailing the structure of the ES).

3.2 EIA Scoping

3.2.1 Due to the urgency of the infrastructure upgrades associated with the Project, the works have been identified as ASTI. To maintain an accelerated programme, a Scoping Opinion has therefore not been requested from the competent authorities.

3.2.2 Each topic chapter in **Volumes 2 – 6** includes a scoping section which details the receptors which have been scoped in or out of the ES with justification.

3.3 Environmental Statement

3.3.1 EIA is the process for identifying the likely significance of environmental effects (beneficial or adverse) arising from a development by comparing the existing environmental conditions with the environmental conditions during the construction and operation of the development. It is intended to support the progressive design of projects so that they avoid adverse environmental effects and minimise the number and extent of unavoidable adverse environmental effects.

3.3.2 The ES sets out the findings of an Environmental Impact Assessment (EIA). This ES will accompany all the consent applications required by the Project and address requirements under the 2017 TCP EIA Regs and the 2017 Electricity Works EIA Regs.

There are no material differences between these two sets of regulations in terms of the required information for inclusion in an ES.

3.3.3 The Project is presented in eight volumes with Volumes 2-6 inclusive assessing each element of works and Volume 7 considering the full project and cumulative effects.

- **Non-Technical Summary (NTS) [The Project].**
- **Volume 1 – Project Introduction.**
- **Volume 2 – Pentir Works.**
- **Volume 3 – Bryncir Works.**
- **Volume 4 – Glaslyn Cables Works.**
- **Volume 5 – Trawsfynydd Works.**
- **Volume 6 – Wider Works.**
- **Volume 7 – The Project and Cumulative Assessment.**
- **Volume 8 – Appendices.**

3.3.4 **Volumes 2 – 6** present assessments of the following environmental topics in Chapters 4 –15 in each Volume:

- **Chapter 4:** Landscape and Visual Amenity.
- **Chapter 5:** Ecology and Nature Conservation.
- **Chapter 6:** Historic Environment.
- **Chapter 7:** Geology, Hydrogeology, Land Use and Agriculture (Soils).
- **Chapter 8:** Water Quality, Resources and Flood Risk.
- **Chapter 9:** Traffic and Transport.
- **Chapter 10:** Air Quality and Emissions.
- **Chapter 11:** Noise and Vibration.
- **Chapter 12:** Socio-Economics.
- **Chapter 13:** Climate Change.
- **Chapter 14:** Materials And Waste.
- **Chapter 15:** In-combination Effects.
- **Chapter 16**: Cumulative Effects.

3.3.5 Figures relevant to each of the ES Chapters are provided at the end of each Volume. All supporting documents are provided in **Volume 8: Appendices**.

3.3.6 Figures for the chapters of Volumes 1-7 are numbered first by Volume, then by the chapter number and then a sequential figure number. For example, the third figure of Volume 2, Chapter 5 is Figure 2.5.3. Appendices follow the same format.

3.3.7 Schedule 4 of the 2017 TCP EIA Regulations provides details of the information required for inclusion in an ES. **Table 3-1** summarises the requirements and where the information is presented in this ES.

Table 3-1 – Location of required information in the ES

Schedule 4 requirements		Location in the ES
1	A description of the development, including in particular:	Volumes 2 – 6, Chapter 2
	(a) a description of the location of the development.	Volumes 2 – 6, Chapter 2
	(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases.	Volumes 2 – 6, Chapter 2
	(c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used.	Volumes 2 – 6, Chapter 2
	(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.	Volumes 2 – 6, Chapter 4 – 16
2	A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Volumes 2 – 6, Chapter 3
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	Volumes 2 – 6, Chapter 2 and 4 – 16
4	A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna	Volumes 2 – 6,

Schedule 4 requirements		Location in the ES
	and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	Chapter 2 and 4 – 16 and Volume 7
5	A description of the likely significant effects of the development on the environment resulting from, inter alia:	
	(a) the construction and existence of the development, including, where relevant, demolition works.	Volumes 2 – 6, Chapter 2 and 4 – 16 and Volume 7
	(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources.	Volumes 2 – 6, Chapter 5, 7 and 8 and Volume 7
	(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste.	Volumes 2 – 6, Chapter 7, 10 and 11 and Volume 7
	(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters).	Volumes 2 – 6, Chapter 10, 11 and 12 and Volume 7
	(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.	Volumes 2 – 6, Chapter 4 – 16 and Volume 7
	(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.	Volumes 2 – 6, Chapter 13 and Volume 7
	(g) the technologies and the substances used.	Volumes 2 – 6, Chapter 4 – 16 and Volume 7
	The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives	Volumes 2 – 6, Chapter 4 – 16 and Volume 7

Schedule 4 requirements		Location in the ES
	established at European Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(1) and Directive 2009/147/EC(2).	
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Volumes 2 – 6, Chapter 4 – 16 and Volume 7
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Volumes 2 – 6, Chapter 4 – 16 and Volume 7
8	A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU(3) of the European Parliament and of the Council or Council Directive 2009/71/Euratom(4) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Volumes 2 – 6, Chapter 4 – 16 and Volume 7
9	A non-technical summary of the information provided under paragraphs 1 to 8.	Volume 0 (overall NTS), Volume 2 – 7 NTS
10	A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	All chapters

4. Environmental Assessment Methodology

4.1 Introduction

4.1.1 EIA is a 'tool for analysing the effects of development proposals on the environment and to mitigate their potential adverse impact'. The 2017 TCP EIA Regulations (Ref 2.1) state that its aim is:

'to protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process. The regulations set out a procedure for identifying those projects which should be subject to an Environmental Impact Assessment, and for assessing, consulting and coming to a decision on those projects which are likely to have significant environmental effects.'

4.1.2 Regulation 4 of the 2017 TCP EIA Regulations') (Ref 2.1) sets out that:

"*(1) the EIA is a process consisting of:*

(a) the preparation of an environmental statement by the person seeking or initiating planning permission;

(b) any consultation, publication and notification required by Parts 5, 9 and where relevant, Part 12 of these Regulations, the 2012 Order or the 2016 Order in respect of EIA development, and

(c) the steps required under regulation 25(1).

(2) The environmental impact assessment must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors -

(a) population and human health;

*(b) biodiversity, with particular attention to species and habitats protected under EU-derived domestic legislation which transposed Directive*92/43/EEC M1 *and Directive* 2009/147/ECM2 *as may be amended from time to time;*

(c) land, soil, water, air and climate;

(d) material assets, cultural heritage and the landscape."

4.2 Consultation

4.2.1 As part of the EIA process, technical consultation with a range of statutory and non-statutory consultees has been ongoing. Details of the technical consultation undertaken is provided in the relevant technical chapters in **Volumes 2 – 6**.

4.3 Baseline Data Collection

4.3.1 This stage includes the gathering of relevant existing information for the study areas and undertaking field surveys to identify and describe the existing conditions, or environmental character, of the area potentially affected by the Project. This data is used to identify environmental receptors. Environmental receptors are the features and aspects of the physical, cultural and socio-economic environment that could potentially be impacted by the Project.

Future Baseline

4.3.2 Schedule 4, Paragraph 3 of the 2017 TCP EIA Regulations requires an outline of the likely evolution of the current state of the environment (baseline scenario) without implementation of the Project, as far as natural changes from the baseline scenario can be assessed with reasonable effort and the availability of environmental information and scientific knowledge.

4.3.3 Whilst there are considerable limitations to the predictions that can be made about baseline conditions at a future point in time, some assessments require projections to account for future change, such as traffic growth.

4.3.4 The cumulative effects assessment will follow the Planning Inspectorate's Advice on Cumulative Effects Assessment Ref 4.1 in so far as it relates to consented and projects in construction forming part of the baseline:

"*Where other existing and, or approved developments are expected to be completed before construction of the proposed NSIP and the effects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment.*"

4.4 Identification of Potential Effects

4.4.1 The likely significant effects (beneficial and adverse) of the Project are predicted and evaluated using appropriate techniques, many of which follow specific best practice guidelines for a particular topic. Potential effects are identified first, usually in summary, as an indication of what effects could theoretically occur in the absence of mitigation (other than mitigation inherent in the design of the Project).

4.5 Mitigation

4.5.1 Where significant adverse environmental effects are identified, mitigation measures may remove, reduce or offset the impacts or reduce their significance. Mitigation of potentially significant adverse environmental effects follows the hierarchy below:

- Avoidance – Measures incorporated into the design to avoid an impact, for example avoiding designated sites.

- Reduction – Incorporate measures to reduce an impact, such as landscape planting to reduce visual impacts of the CSEC.
- Restoration and/or remediation – Where it is not possible to avoid or reduce a significant effect then offsetting impacts will be considered, for example the provision of replacement habitat within the site area to replace that lost by new infrastructure.
- Offsetting: Where relevant and appropriate to the specific impact, offsetting aims to compensate for any residual, adverse impacts after full implementation of the previous measures of the mitigation hierarchy, for example, creating new habitats outside the red line boundary.
- Enhancement – Measures that are over and above any avoidance, reduction and compensation measures required to neutralise the impact of the Project and that ensure the success of a wider range of direct and indirect benefits that could possibly flow from the project

4.5.2 Each of the technical chapters 4 – 15 in **Volumes 2 – 6** includes a section on the measures proposed to mitigate potentially significant effects of the Project, together with enhancement measures where relevant.

4.6 Assessment of Residual Likely Significant Effects

4.6.1 The classification of each effect identified has been assessed based on the magnitude of the environmental change/impact resulting from the Project and the sensitivity and value of the affected receptor. The classification of residual effects has been assessed based on the extent to which additional mitigation measures will avoid, prevent, reduce, compensate or offset adverse effects.

4.6.2 The assessment of likely effects presented in technical chapters 4-15 consider several criteria to determine the significance of effects. Effects have been assessed quantitatively where possible. The following criteria have been considered in identifying likely effects of the Project:

- Relevant legislation and planning policy
- International, national, regional and local standards
- Likelihood of occurrence of the effect
- Geographical extent of effect
- Sensitivity and/or value of the receptor
- Magnitude and complexity of impact
- Whether the effect is temporary or permanent
- Duration (short, medium or long-term), frequency and reversibility of effect
- Whether the effect is direct or indirect, secondary or transboundary
- Inter-relationships between different effects (both cumulatively and in terms of likely effect interactions)
- The outcomes of consultations

4.6.3 Where established topic-specific methodologies deviate from this approach this is described in the methodology section of the relevant technical chapter.

Magnitude of change or impact

4.6.4 The magnitude of change or impact is defined as the deviation from the established baseline conditions due to the Project. The magnitude of change or impact is described in technical chapters 4–15 and has been determined using quantifiable data, national and international standards or limits and professional judgement based on experience with similar projects. The scale used and the broad criteria, unless otherwise stated, is described in **Table 4-1**.

Table 4-1 – Degrees of magnitude and their criteria

Magnitude of effect	Criteria
Major	Total loss or major or substantial alteration to elements or features of the baseline conditions such that the post development character, composition or attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more elements or features of the baseline conditions such that post development character, composition or attributes of the baseline will be materially changed.
Minor	A minor shift away from baseline conditions. Change arising from the loss or alteration will be discernible or detectable but the underlying character/composition or attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a 'no change' situation.

Sensitivity and value of receptors

4.6.5 The sensitive receptors considered in this ES are identified in technical chapters 4–15 of **Volumes 2–6**. The sensitivity of these receptors to change is defined in technical chapters 4-15 and has been determined by quantifiable data, existing designations and professional judgement based on experience with similar projects. The scale used and the broad criteria, unless otherwise stated, is described in **Table 4-2**.

Table 4-2 – Degrees of sensitivity and their criteria

Sensitivity	Criteria
High	The receptor or resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor or resource has moderate capacity to absorb change without significantly altering its present character or is of high and more than local (but not national or international) importance.
Low	The receptor or resource is tolerant of change without detrimental effect, is of low or local importance.

Negligible	The receptor or resource can accommodate change without material effect, is of limited importance.

Determining significance

4.6.6 Determining the significance of a change/impact is derived from the interaction of a receptor's sensitivity and the magnitude of change as shown in **Table 4-3**. Effects considered to be likely significant and therefore material in the decision-making process are shown in the shaded cells.

Table 4-3 – Degree of significance

Magnitude	**Sensitivity**			
	High	**Medium**	**Low**	**Negligible**
Major	Major	Major	Moderate	Negligible/Minor
Moderate	Major	Moderate	Minor	Negligible
Minor	Moderate	Negligible/Minor	Negligible	Negligible
Negligible	Negligible/Minor	Negligible	Negligible	Negligible

4.6.7 The above magnitude, sensitivity, value and significance criteria are provided as a guide for specialists to categorise the significance of effects in the ES. Where discipline-specific methodology has been applied that differs from the generic criteria above, this is described in **Volume 8, Appendix 1.4.A: Topic Assessment Methodology**.

4.7 In-combination and Cumulative Effects

4.7.1 When undertaking an assessment of the environmental effects of a development, it is necessary to consider how various effects may interact and how the effects of the Project could accumulate with the effects of other developments proposed in the same area of influence.

4.7.2 Part 1, Paragraph 4, (2)(e) of the 2017 TCP EIA Regulations notes the following in relation to in-combination effects:

'The EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors –

(e) the interaction between the factors referred to in sub-paragraphs (a) to (d).'

4.7.3 The factors listed in sub-paragraphs (a) to (d) include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape.

4.7.4 Schedule 4, Paragraph 5(e) of the 2017 TCP EIA Regulations states that the ES should include a description of the likely significant effects of the development on the environment resulting from:

'*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.'*

In-combination effects (Intra-project effects)

4.7.5 In-combination effects derive from the various effects of a development which, when acting together, would result in a new or different likely effect which could be of greater significance. An example of an in-combination effect could be where a receptor is affected by dust, noise and traffic disruption during the construction of the Project, with the result being a greater level of nuisance than each individual effect alone.

4.7.6 In-combination effects are assessed in **Chapter 14: In-combination Effects** of **Volumes 2-6 and Volume 7, The Project and Cumulative Assessment, Chapter 4**

4.7.7 Similarly different elements of the development as assessed in **Volumes 2-6** may in combination have a greater significance when presented together for the Project as a whole. These effects are set out in **Volume 7**.

Cumulative effects (inter-project effects)

4.7.8 Cumulative effects can occur as a result of the construction or operation of the Project in addition to any other contemporaneous developments in the same study area. The effect from the Project in isolation might not be significant, but when considered together with effects of other developments could create a significant cumulative effect. These include developments separate from and related to the Project.

4.7.9 Cumulative effects are considered in **Volume 7: The Project and Cumulative Assessment** signposted in **Chapter 5 Cumulative Effects** of **Volumes 2-6.**

4.8 Monitoring

4.8.1 Monitoring may sometimes be required to confirm the effectiveness of proposed mitigation measures, particularly if there has been any uncertainty, or difficulties in assessing effects. In accordance with Paragraph 7 of Schedule 4 of the 2017 TCP EIA Regulations, any monitoring required is described in the mitigation section of each of the technical chapters in **Volumes 2 – 6**.

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Ref 2.3 – Welsh Government (2024). *Planning Policy Wales – Edition 12*. Available at: https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf. Accessed October 2024.

Ref 4.1 – Planning Inspectorate (2019) A*dvice Note Seventeen: Cumulative Effects Assessment relevant to National Significant Infrastructure https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment*. Accessed May 2025

Figures

Figure 1.1.1: The Project Location

Figure 1.1.2: The Project

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